SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Marindahl Lake, Yankton County
2102-F-21-R-48
2015

Figure 1. Marindahl Lake, Yankton County

Legal Description: T95N-R54W-Sec. 7, 17, 18, 20
Location from nearest town: 4 miles west and 3 miles south of Irene, SD

Surface Area: 139 acres
Meandered (Y/N): Yes
OHWM elevation: 1598.3
Outlet elevation: 1597.3
Max. depth at outlet elevation: 30 feet
Observed water level: Low
Contour map available: Yes

Watershed area: 7,658 acres
Shoreline length: 16.2 miles
Date set: December, 1981
Date set: February, 1987
Mean depth at outlet elevation: 13 feet
Lake volume: 11,000 acre feet
Date mapped: November, 2002

DENR beneficial use classifications: (4) warm water permanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering

Introduction

General

Marindahl Lake is an artificial impoundment created when the South Dakota Department of Game, Fish and Parks (GFP) constructed an earthen dam across Clay Creek in 1952.

Ownership of Lake and Adjacent Lakeshore Properties

Marindahl Lake and the surrounding shoreline are owned and managed by the South Dakota Department of Game, Fish and Parks (GFP).

Fishing Access

The Marindahl Lake Access Area is located on the southwest corner of the lake near the dam and contains a single lane boat ramp, boat dock, public toilet and many shore fishing areas. Many other shore fishing areas are located around the lake. Several improvements to the fishing access roads were completed in 2009.

Water Quality and Aquatic Habitat

The water in Marindahl during the survey was very clear with a Secchi depth measurement of 1 m (39 in., Table 1). Sparse stands of sago pondweed (*Potamogeton pectinatus*) were observed. Cattail (*Typha spp.*) and smartweed were common in the shallow areas of the lake.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Marindahl Lake, Yankton County, 2006-2015.

Year	*Water Temp °C (°F)*	*Secchi Depth cm (in)*	*Observations/Comments (algae, aquatic vegetation, water quality, etc.)*
2005	23 (74)	124 (49)	Cattails
2014	26 (78)	100 (39)	No aquatic vegetation was observed
2013	-- (--)	185 (73)	No observations were recorded
2011	28 (83)	41 (16)	Sago pondweed
2009	20 (68)	66 (26)	Stained coffee colored
2007	27 (80)	-- (--)	Cattails and sago pondweed, brown water

Fish Community

Marindahl Lake supports a fish community typical of southeastern South Dakota impoundments (Table 2). The lake contains a variety of panfish including largemouth bass, bluegill, black crappie and green sunfish. Panfish abundance is highly variable and bluegill and bass reproduction and recruitment is limited due to a lack of aquatic vegetation. The lake also has abundant channel catfish, some black bullheads, white sucker and common carp. Pre-spawn adult gizzard shad were stocked in 2015 and successfully reproduced. No fish kills have been documented at Marindahl Lake (Table 3).

Table 2. Fish species commonly found in Marindahl Lake, Yankton County.

Game Species	***Other Species***
Largemouth Bass	Common Carp
Bluegill	White Sucker
Black Crappie	Gizzard Shad
Channel Catfish	
Black Bullhead	
Green Sunfish	

Fish Management

Marindahl Lake is managed for largemouth bass, black crappie, bluegill and channel catfish. Challenges include sporadic recruitment of panfish and panfish that do not attain a size acceptable to anglers due to slow growth and high mortality as adults. Removals of bluegill and black crappie, done to reduce competition for food and improve growth, have had some success. Adult and spring-stocked, large-fingerling largemouth bass were stocked (Table 4) to provide a better fishery and to reduce panfish abundance through predation, but that has been relatively unsuccessful. A pre-spawn, adult gizzard shad stocking was made to provide abundant young-of-the-year shad as a source of food for largemouth bass and crappie.

Table 3. Fish kill history for Marindahl Lake, Yankton County.

Year	***Severity***	***Comments***
		No fish kills have been documented for Marindahl Lake

Table 4. Stocking history for Marindahl Lake, Yankton County, 2006-2015.

Year	***Number***	***Species***	***Size***
2006	320	Largemouth Bass	Adult
2009	2,025	Largemouth Bass	Juvenile
2011	2,880	Largemouth Bass	Large Fingerling
2013	3,104	Largemouth Bass	Large Fingerling
	3,424	Rainbow Trout	Fingerling
2015	74	Gizzard Shad	Adult
	1,590	Largemouth Bass	Juvenile

Methods

Marindahl Lake was sampled on August 17-19, 2015 with 10 overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh (3/4 in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. Two hours of electrofishing was done on June 3, 2015 to sample the largemouth bass population.

Results and Discussion

Net Catch Results

Small black bullheads were most abundant in the trap nets followed by bluegill (Tables 5 and 6). White sucker and black crappie were also relatively abundant (Table 7).

Table 5. Total catch from 10 overnight trap nets set in Marindahl Lake, Yankton County, August 17-19, 2015.

Species	***#***	***%***	***CPUE***	***80% C.I.***	***Mean CPUE****	***PSD***	***RSD-P***	***Mean Wr***
Black Bullhead	1,852	74.4	185.2	±105.3	42.2	1	0	--
Bluegill	219	8.8	21.9	±5.3	28.2	49	1	92
White Sucker	198	8.0	19.8	±14.4	20.8	100	99	--
Black Crappie	191	7.7	19.1	±6.1	29.9	2	1	116
Channel Catfish	15	0.6	1.5	±0.9	2.1	31	8	78
Green Sunfish	12	0.5	1.2	±0.7	1.0	17	0	91
Common Carp	2	0.1	0.2	±0.2	0.2	--	--	--
Largemouth Bass	1	0.0	0.1	±0.1	0.1	--	--	--

*10 years (2006-2015)

Table 6. CPUE by length category for selected species sampled with trap nets in Marindahl Lake, Yankton County, August 17-19, 2015.

Species	***Substock***	***Stock***	***S-Q***	***Q-P***	***P+***	***All sizes***	***80% C.I.***
Black Bullhead	--	185.2	183.4	1.8	--	185.2	±105.3
Bluegill	--	21.9	11.2	10.5	0.2	21.9	±5.3
White Sucker	--	19.8	--	0.2	19.6	19.8	±14.4
Black Crappie	0.1	19.0	18.7	0.2	0.1	19.1	±6.1
Channel Catfish	0.2	1.3	0.9	0.3	0.1	1.5	±0.9
Green Sunfish	--	1.2	1.0	0.2	--	1.2	±0.7
Common Carp	0.1	0.1	0.1	--	--	0.2	±0.2
Largemouth Bass	0.1	--	--	--	--	0.1	±0.1

Length categories can be found in Appendix A.

Table 7. Trap-net CPUE for all fish species sampled in Marindahl Lake, Yankton County, 2006-2015.

Species	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Black Bullhead		0.1		0.3		4.0		11.0	52.5	185.2
Black Crappie		35.2		69.9		46.1		3.6	5.6	19.1
Bluegill		26.3		28.0		81.9		6.3	4.7	21.9
Channel Catfish		3.9		0.5		4.3		1.8	0.5	1.5
Common Carp		1.3		0.1		1.1		2.8	2.6	0.2
Green Sunfish		0.4		0.3		3.5		0.5	0.3	1.2
Hybrid Sunfish		--		--		--		0.3	--	--
Largemouth Bass		--		--		0.3		--	--	0.1
White Sucker		25.4		25.4		43.7		4.8	5.5	19.8
Yellow Perch		--		0.1		0.3		--	--	--

Largemouth Bass

Management Objective

- Maintain a largemouth bass population with a total electrofishing CPUE of at least 20.

Management Strategies

- Stock hatchery-reared, large fingerling largemouth bass in the spring as needed.
- Introduce gizzard shad as a potential source of forage and evaluate.

Juvenile largemouth bass, stocked about a week prior to electrofishing, dominated the catch (Table 8, Figures 3,4) indicating that short-term post-stocking survival was good. CPH of fish from the naturally-reproduced 2013 year class decreased substantially from 2014 (Figure 4).

Table 8. Largemouth bass electrofishing CPH, PSD, RSD-P, and mean Wr for Marindahl Lake, Yankton County, 2006-2015. Columns for stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE		14.0		7.0				12.6	26.5	170.0
PSD		92		91				100	100	1
RSD-P		64		27				85	100	1
Mean Wr		99		109				97	107	--

Table 9. Largemouth bass stocked into Marindahl Lake, Yankton County, 2006-2015.

Year	***Number***	***Size***
2006	320	Adult
2009	2,025	Juvenile
2011	2,880	Large Fingerling
2013	3,104	Large Fingerling
2015	1,590	Juvenile

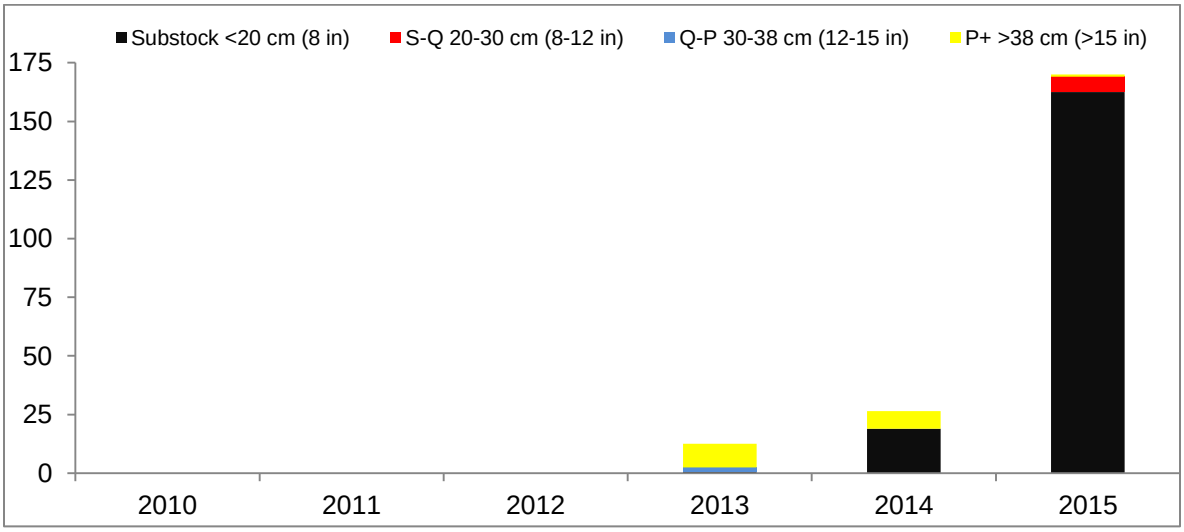

Figure 2. CPUE by length category for largemouth bass sampled by electrofishing in Marindahl Lake, Yankton County, 2010-2015.

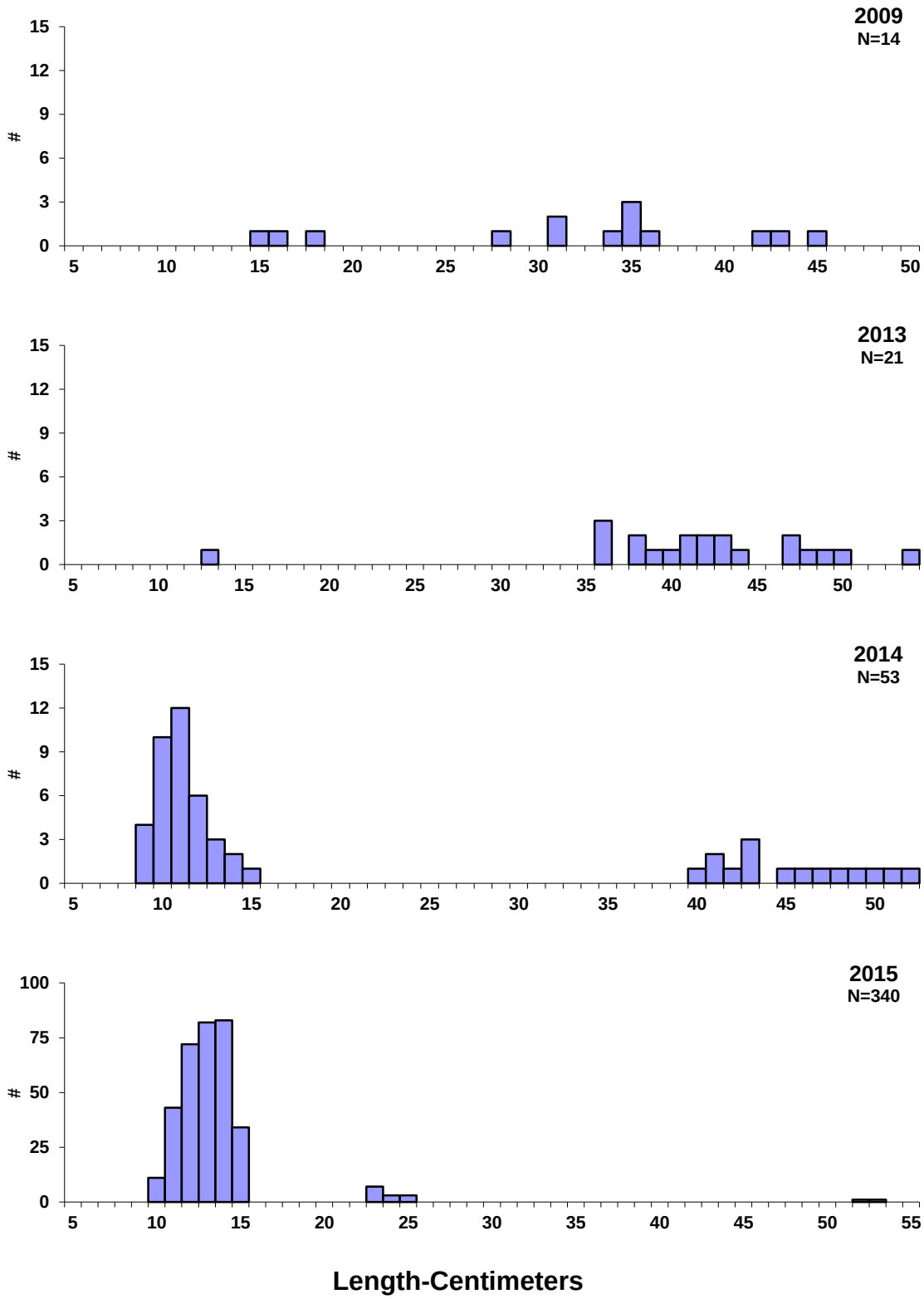

Figure 3. Length frequency histograms for largemouth bass sampled by electrofishing in Marindahl Lake, Yankton County, 2009, 2013, 2014, 2015.

Bluegill

Management objective: Maintain a bluegill fishery with a trap net CPUE of at 25-50 and RSD-18 of at least 20.

Management Strategy

- Reduce bluegill abundance, when high, through removal (trap and transfer to other waters) in order to improve growth rates and size structure

Trap-net CPUE increased from 4.7 in 2014 to 21.9 in 2015 (Table 10). Fish from the 2012, 2013 and 2014 year classes were well-represented in the catch indicating consistent natural recruitment since the drought and low-water level in 2012. Growth is above average for small lakes and impoundments and similar to Regional and statewide averages (Table 11). Although growth for Marindahl bluegills often slows after age-3+, currently, age-4+ fish are reaching the objective size of 18 cm (7 in). Improved growth may, in part, be due to the relatively low abundance of panfish in Marindahl over the past few years.

Table 10. Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Marindahl Lake, Yankton County, 2006-2015.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2005***
CPUE		26.3		28.0		81.9		6.3	4.7	21.9
PSD		74		73		38		49	32	49
RSD-18		4		6		13		2	9	4
RSD-P		0		0		0		0	2	1
Mean Wr		94		92		94		104	108	92

Table 11. Average back-calculated lengths (mm) for each age class of bluegill in Marindahl Lake, Yankton County, 2015.

			Back-calculation Age							
Year Class	**Age**	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
2014	1	107	57							
2013	2	52	57	136						
2012	3	50	60	146	162					
2011	4	9	51	114	152	172				
All Classes		**218**	**56**	**132**	**157**	**172**				
Statewide Mean			55	103	141	166				
Region III Mean			60	116	157	180				
SLI* Mean			53	101	138	163				

* Small Lakes and Impoundments

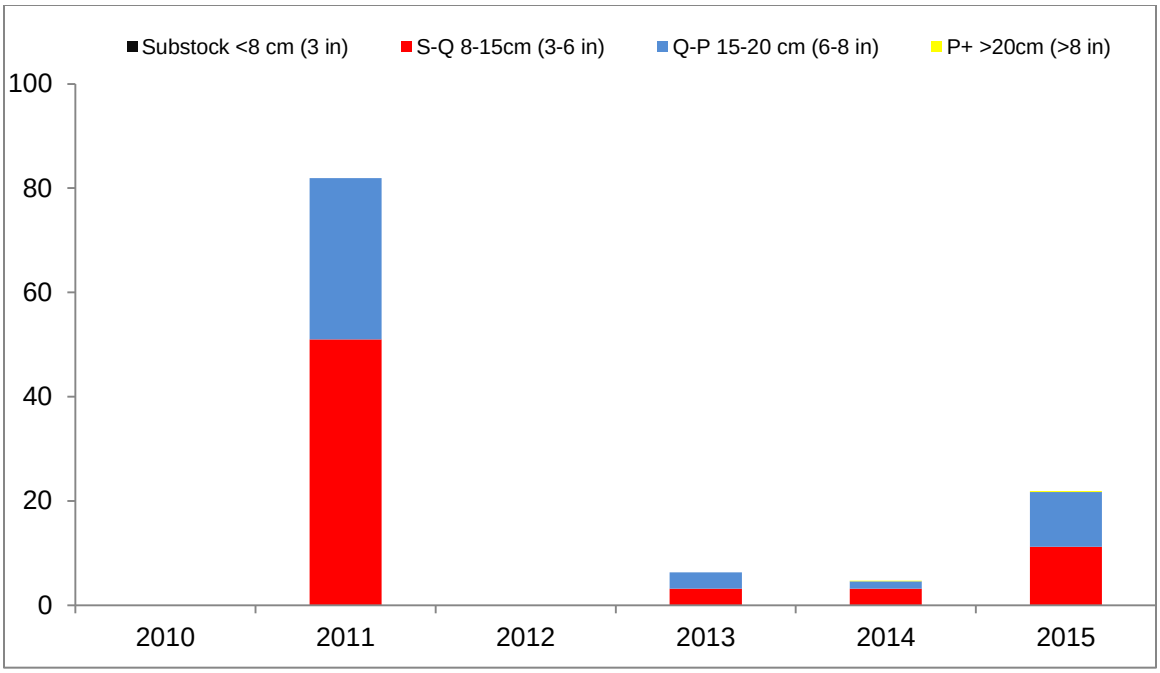

Figure 4. CPUE by length category for bluegill sampled with trap nets in Marindahl Lake, Yankton County, 2010-2015.

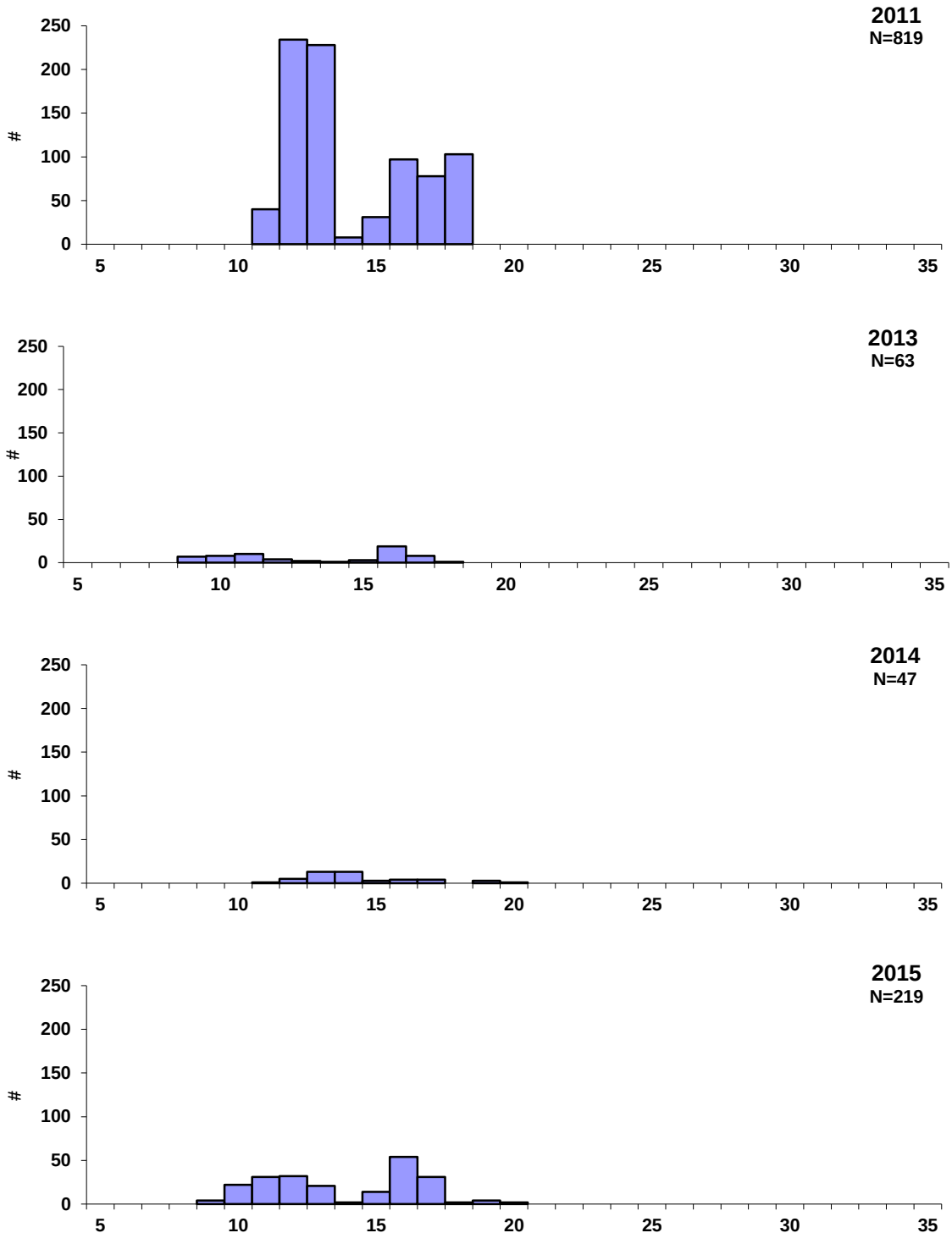

Figure 5. Length frequency histograms for bluegill sampled with trap nets in Marindahl Lake, Yankton County, 2011, 2013, 2014, and 2015.

Black Crappie

Management Objective

- Maintain a black crappie population with a trap net CPUE of at least 20 and PSD of at least 40.

Management Strategies

- Reduce crappie abundance, when high, through removal (trap and transfer to other waters) in order to improve growth rates and size structure
- Introduce gizzard shad as a potential source of forage.

Like bluegill, trap-net CPUE of black crappies increased substantially from 2014 to 2015 (Table 12). However, this is due entirely to the recruitment of abundant age-1+ fish to the gear (Table 13). Growth of single representatives from the 2011, 2012 and 2013 year classes was excellent, especially for Marindahl, and most likely reflects the low overall abundance of panfish.

Table 12. CPUE, PSD, RSD-P, and mean Wr for all black crappie sampled with trap nets in Marindahl Lake, Yankton County, 2006-2015.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE		35.2		69.9		46.1		3.6	5.6	19.1
PSD		11		33		93		47	98	2
RSD-P		0		0		0		3	0	1
Mean Wr		101		95		97		105	104	116

Table 13. Average back-calculated lengths (mm) for each age class of black crappie in Marindahl Lake, Yankton County, 2015.

			Back-calculation Age							
Year Class	**Age**	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
2014	1	188	80							
2013	2	1	113	201						
2012	3	1	139	206	232					
2011	4	1	134	176	215	236				
All Classes			**116**	**194**	**224**	**236**				
Statewide Mean			83	147	195	229	249			
Region III Mean			95	167	219	253	274			
SLI* Mean			78	134	180	209	226			

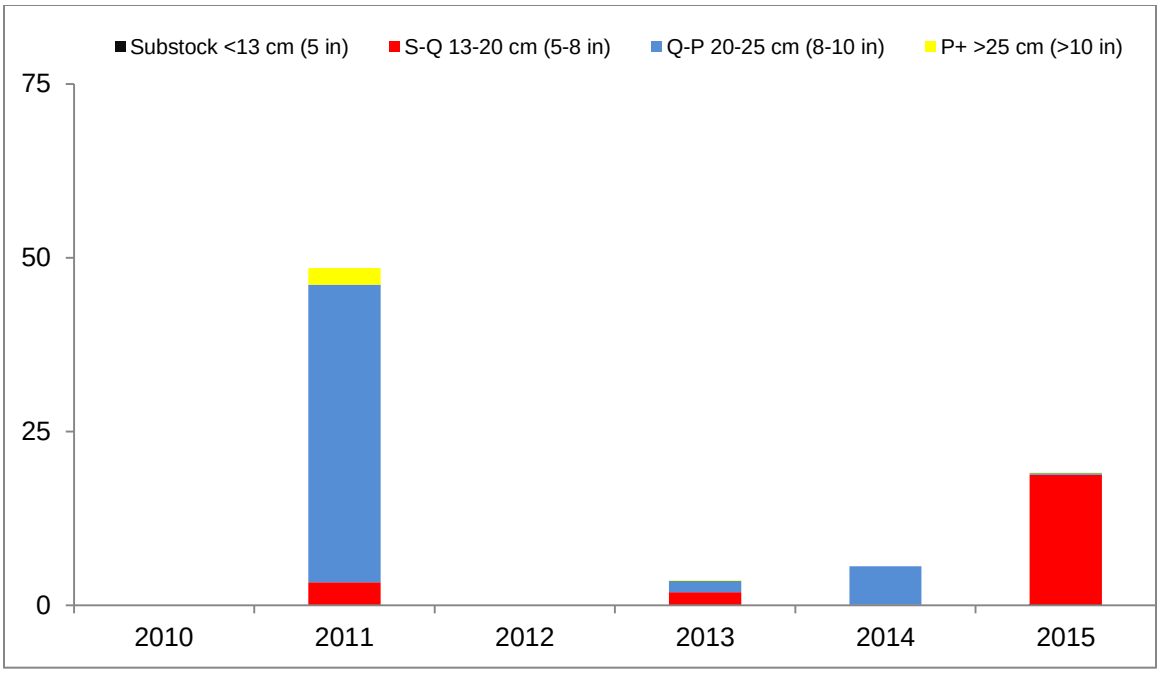

Figure 6. CPUE by length category for black crappies sampled with trap nets in Marindahl Lake, Yankton County, 2010-2015.

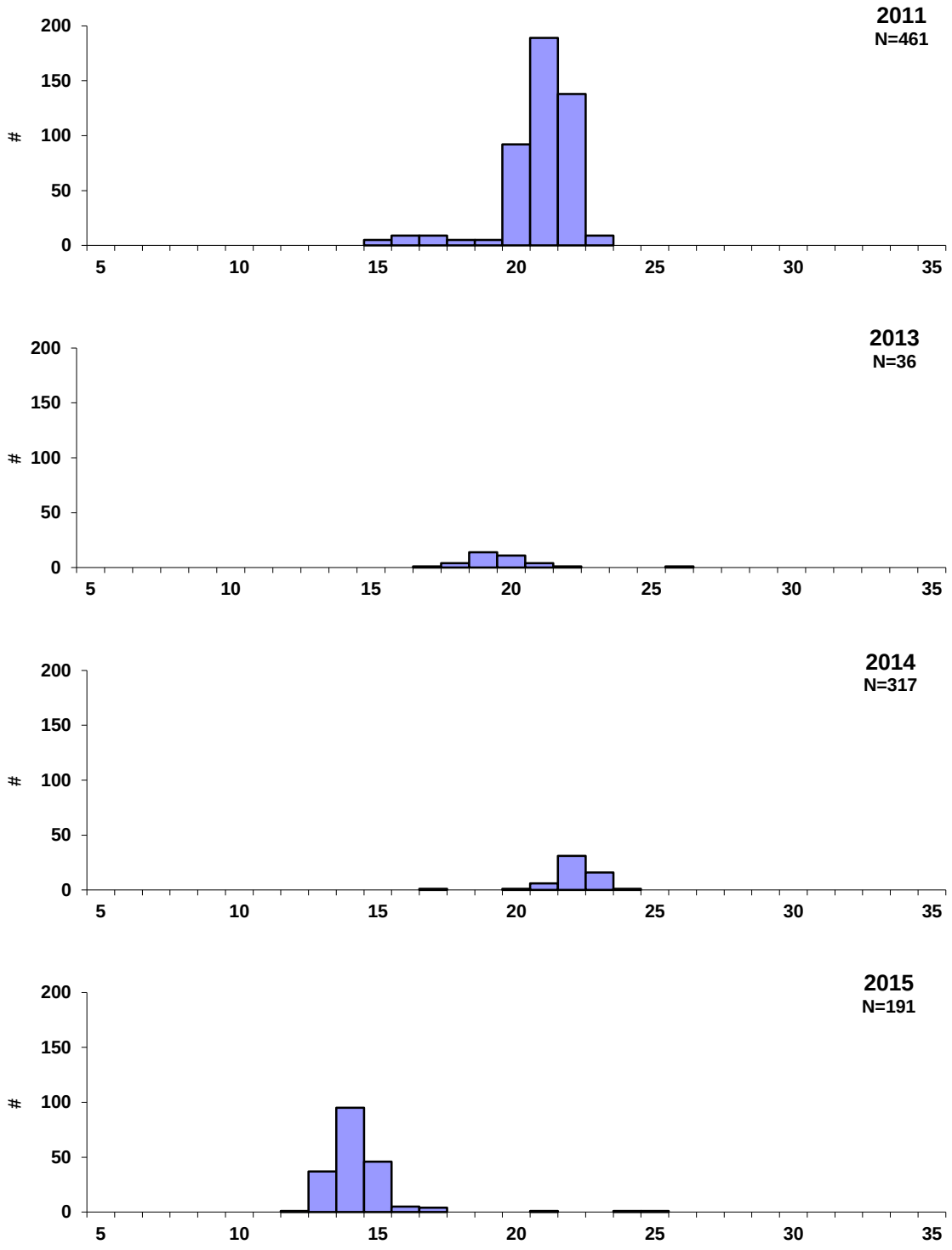

Figure 7. Length frequency histograms for black crappie sampled with trap nets in Marindahl Lake, Yankton County, 2011, 2013, 2014, and 2015.

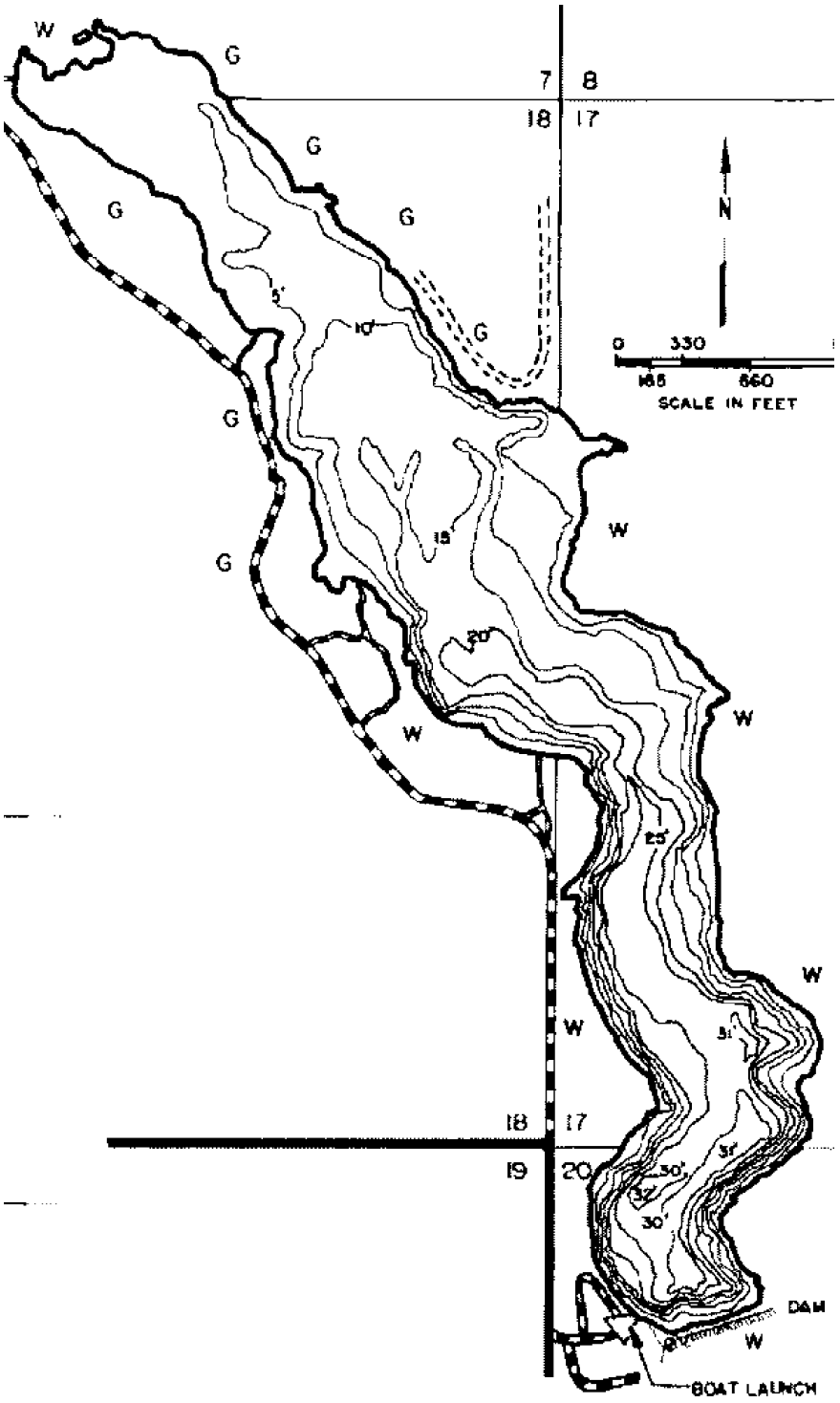

Figure 8. Contour map of Marindahl Lake, Yankton County.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (Inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.